

## TITLE OF THE INVENTION

### REFRIGERATOR

## CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of Korean Patent Application No.2004-5 21491, filed on March 30, 2004, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates to a refrigerator, and, more particularly, to a 10 refrigerator in which an assembly structure of a freezing chamber door for opening and closing a freezing chamber and a refrigerating chamber door for opening and closing a refrigerating chamber is improved so that upper, lower and both side covers are attached to frames of the doors without a gap.

### 2. Description of the Related Art

15 Generally, a refrigerator is an apparatus for maintaining freshness of various foods stored in freezing and refrigerating chambers for a long period of time by supplying cool air generated from an evaporator to the freezing and refrigerating chambers. The freezing chamber stores foods, such as meat, which must be maintained below the freezing point, and the refrigerating chamber stores foods, such 20 as vegetables and fruits, which must be maintained at a temperature slightly higher than the freezing point.

The freezing and refrigerating chambers are divided from each other by an intermediate partition, and a plurality of racks and a plurality of storage boxes are installed in the freezing and refrigerating chambers so as to conveniently store foods.

5      Further, a freezing chamber door is installed at an opened front surface of the freezing chamber and a refrigerating chamber door is installed at an opened front surface of the refrigerating chamber, thereby respectively opening and closing the freezing and refrigerating chambers.

Generally, each of the freezing and refrigerating chamber doors includes a frame filled with a thermal insulation material for closing the corresponding opened front

10     surface of the freezing and refrigerating chambers, and upper, lower and both side covers for covering upper, lower and both side surfaces of the frame to improve the appearance of the corresponding door.

Since the upper, lower and both side covers of the freezing and refrigerating doors of the above-described conventional refrigerator are not interconnected to each

15     other, but are fixedly connected to the corresponding frame, the inattentive assembly of the upper, lower and both side covers with the frame causes gaps among the upper, lower and both side covers. Further, the repeated opening and closing of the doors extends the gaps among the upper, lower and both side covers, thus defiling the appearance of the freezing and refrigerating chamber doors.

20     Moreover, the above structure of the door, in which the upper, lower and both side covers are connected only to the frame, causes a difficulty in setting precise connection positions between the upper and lower covers and the frame, thereby causing inconvenience to workers in an assembly process and increasing an assembly time.

## 25     SUMMARY OF THE INVENTION

Therefore, an aspect of the invention is to provide a refrigerator, in which assembly structures of freezing and refrigerating chamber doors are improved so that upper, lower and both side covers of each of the doors are conveniently attached to frames of the corresponding doors and contact the frames without a gap.

- 5 In accordance with one aspect, the present invention provides a refrigerator provided with at least one storage chamber and a door for opening and closing the storage chamber, wherein the door comprises: a frame for defining a main body of the door; both side covers for covering both side surfaces of the frame; and upper and lower covers for covering upper and lower surfaces of the frame, wherein the upper and  
10 lower covers include a first connection portion connected to at least one of both side covers, and at least one of both side covers includes a second connection portion corresponding to the first connection portion.

The first connection portion may include holes, and the second connection portion may include protuberances inserted into the holes.

- 15 The holes may be prepared in pairs and positioned at both side ends of the upper and lower covers, and the protuberances may be prepared in pairs and positioned at upper and lower ends of both side covers.

A grip may be formed integrally with one of both side covers, thereby allowing the door to efficiently open and close a main body of the refrigerator.

20 BRIEF DESCRIPTION OF THE DRAWINGS

The above objects, and other features and advantages of the present invention will become more apparent after reading the following detailed description when taken in conjunction with the drawings, in which:

FIG. 1 is a perspective view of a refrigerator in accordance with the present

invention;

FIG. 2 is a partially exploded perspective view of the portion "A" of FIG. 1 illustrating the connection of upper and right covers to a frame of a door;

FIG. 3 is a partially enlarged perspective view of the upper and right covers of  
5 FIG. 2;

FIG. 4 is a plan view of FIG. 2;

FIG. 5 is a partially exploded perspective view of the portion "B" of FIG. 1 illustrating the connection of lower and left covers to the frame of the door;

FIG. 6 is a partially enlarged perspective view of the lower and left covers of  
10 FIG. 5; and

FIG. 7 is a bottom view of FIG. 5.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now, a preferred embodiment of the present invention will be described in detail with reference to the annexed drawings.

15 FIG. 1 is a perspective view of a refrigerator in accordance with the present invention. As shown in FIG. 1, the refrigerator of the present invention comprises a cabinet 1 having a box shape provided with an opened front surface for defining the appearance of the refrigerator, a freezing chamber (not shown) and a refrigerating chamber 3, for storing foods, divided by an intermediate partition 2 longitudinally  
20 disposed in the cabinet 1 such that they are respectively aligned side by side, a refrigerating chamber door 4 connected to the front surface of the refrigerating chamber 3 for opening and closing the refrigerating chamber 3 and a freezing chamber door 5 connected to the front surface of the freezing chamber for opening and closing the freezing chamber, and has a structure such that the internal space of the cabinet 1 is  
25 divided into two spaces aligned side by side. In case that the intermediate partition 2 is transversely disposed in the cabinet 1, the inside space of the cabinet 1 is horizontally

divided into two transversal spaces, i.e., upper and lower spaces serving as the freezing chamber and the refrigerating chamber 3.

A plurality of racks 6 and boxes 7 for divisionally storing various foods are disposed longitudinally in the freezing chamber and the refrigerating chamber 3. The 5 refrigerating and freezing chamber doors 4 and 5, for opening and closing the refrigerating chamber 4 and the freezing chamber, are rotatably connected to the cabinet 1 by hinge members 8 and hinge shafts 9 (with reference to FIG. 5) installed at upper and lower parts of the opened front surface of the cabinet 1.

Hereinafter, with reference to FIGS. 2 to 7, an assembly structure of the doors 10 of the refrigerator of the present invention will be described in detail. Here, since the refrigerating chamber door 4 and the freezing chamber door 5 have the same structure, only the structure of the freezing chamber door 5 will be described for convenience.

FIG. 2 is a partially exploded perspective view of the portion "A" of FIG. 1 illustrating the connection of upper and right covers to a frame of a door. FIG. 3 is a 15 partially enlarged perspective view of the upper and right covers of FIG. 2. FIG. 4 is a plan view of FIG. 2.

As shown in FIG. 2, the freezing chamber door 5 (hereinafter, referred to as a "door") includes a frame 10 having an approximately rectangular shape for defining the appearance of the door 5, right and left covers 20a and 20b respectively covering right 20 and left surfaces of the frame 10, and upper and lower covers 30a and 30b (with reference to FIG. 5) respectively covering upper and lower surfaces of the frame 10.

The frame 10 has a size suitable for covering the opened front surface of the freezing chamber, and the inside of the frame 10 is filled with a thermal insulation material 15 having a designated thickness (with reference to FIG. 5) so as to be 25 insulated from the outside of the frame 10.

First to third protrusions 11, 12 and 13 are formed on a right end of the frame

10 in a longitudinal direction of the frame 10 by cutting the right end of the frame 10, thereby causing the frame 10 to be connected to the right cover 20a so that the surface of the frame 10 is coplanar with the surface of the right cover 20a. Further, screw holes 14 for connecting the right cover 20a and the upper cover 30a to the frame 10 are 5 formed through the right end of the frame 10.

The right cover 20a being opposite to the left cover 20b connected to the hinge member 8 includes a base portion 21 having a width and a length corresponding to those of the right side surface of the frame 10 for covering the right side surface of the frame 10, a grip 22 integrally extended from a front part of the base portion 21 for 10 allowing a user to simply open and close the door 5, a first flange portion 23 extended from the base portion 21 toward the front surface of the frame 10 so as to have a length reaching the end of the first protrusion 11 of the frame 10, and a second flange portion 24 extended from the base portion 21 toward the rear surface of the frame 10 so as to have a length reaching the end of the third protrusion 31 of the frame 10.

15 A bracket 25 provided with a screw hole for connecting the right cover 20a to the upper cover 30a by a screw is integrally formed at a corner, at which the base portion 21 is connected to the first flange portion 23, and a protuberance 40 is protruded from the end of the first flange portion 23 toward the front surface of the frame 10 (with reference to FIG. 3).

20 The upper cover 30a includes a base portion 31 having a width and a length corresponding to those of the upper surface of the frame 10 for covering the upper surface of the frame 10, a first flange portion 32 extended from the front end of the base portion 31 toward the front surface of the frame 10 so as to have a designated length, and a second flange portion 34 extended from the rear end of the base portion 31 25 toward the rear surface of the frame 10 so as to have a designated length (with reference to FIG. 5).

A fourth protrusion 34 and a fifth protrusion 35 are respectively formed at the

front and rear ends of the right side of the base portion 31 of the upper cover 30a by cutting the base portion 31. Further, screw holes 36 for connecting the upper cover 30a to the frame 10 and the right cover 20a by a screw 27 are formed through the right end of the base portions 31.

5 A hole 50 having a width and a depth corresponding to those of the protuberance 40 formed on the right cover 30a is formed through the end of the fourth protrusion 34 of the upper cover 30a, thereby allowing the protuberance 40 to be inserted thereinto (with reference to FIG. 3).

10 The right end of the lower cover 30b has the same structure as that of the above-described upper cover 30a, and thus its detailed structure will be omitted.

FIG. 5 is a partially exploded perspective view of the portion "B" of FIG. 1 illustrating the connection of the lower and left covers to the frame of the door. FIG. 6 is a partially enlarged perspective view of the lower and left covers of FIG. 5. FIG. 7 is a bottom view of FIG. 5.

15 As shown in FIG. 5, the left cover 20b and the lower cover 30b respectively have the same structures as those of the right cover 20a and the upper cover 30a except the left cover 20b includes a space 28 for containing the hinge member 8 (with reference to FIG. 1) for rotatably connecting the door 5 to the cabinet 1 and the hinge shaft 9 and the lower cover 30b includes a protuberance 38. Accordingly, parts of the 20 left and lower covers 20b and 30b the same as those of the right and upper covers 20a and 30a are represented by the same reference numeral, and thus only their brief descriptions are given.

The left cover 20b includes a base portion 21 having a width and a length corresponding to those of the left side surface of the frame 10 for covering the left side 25 surface of the frame 10, a first flange portion 23 extended from the base portion 21 toward the front surface of the frame 10 so as to have a length reaching the end of the

first protrusion 11 of the frame 10, and a second flange portion 24 extended from the base portion 21 toward the rear surface of the frame 10 so as to have a length reaching the end of the third protrusion 31 of the frame 10. Further, a protuberance 40 is formed integrally with the end of the first flange portion 23 toward the front surface of the frame

5 10 (with reference to FIG. 6).

The left cover 20b does not require the grip 22, differently from the right cover 20a. Further, since the left cover 20b does not require the bracket 25, the left end of the frame 10 does not have a portion corresponding to the second protrusion 12 formed on the right end of the frame 10. However, the bracket 25 provided with screw holes may

10 be installed at the lower and upper ends of the left cover 20b.

The lower cover 30b includes a base portion 31 having a width and a length corresponding to those of the lower surface of the frame 10 for covering the lower surface of the frame 10, a first flange portion 32 extended from the front end of the base portion 31 toward the front surface of the frame 10 so as to have a designated length,

15 and a second flange portion 33 extended from the rear end of the base portion 31 toward the rear surface of the frame 10 so as to have a designated length.

A fourth protrusion 34 and a fifth protrusion 35 are respectively formed at the front and rear ends of the right side of the base portion 31 of the lower cover 30b by cutting the base portion 31. Further, screw holes 36 for connecting the lower cover 30b

20 to the frame 10 by a screw 27 are formed through the left end of the base portion 31.

A hole 50 having a width and a depth corresponding to those of the protuberance 40 formed on the left cover 30b is formed through the end of the fourth protrusion 34 of the lower cover 30b, thereby allowing the protuberance 40 to be inserted thereinto (with reference to FIG. 6). Further, a through hole 37 is formed at the

25 extension 38 extended from the base portion 31 to the left, and the hinge shaft 9 downwardly protruded from the lower surface of the frame 10 passes through the through hole 37 and is then inserted into the lower end of the cabinet 1.

Although not shown in the drawings, the right end of the upper cover 30a has the same structure as that of the above-described right end of the lower cover 30b.

Hereinafter, a process for assembling the right and left covers 20a and 20b and the upper and lower covers 30a and 30b with the frame 10 will be described in 5 detail.

First, when the right cover 20a is inserted into the right surface of the frame 10, the first flange portion 23 of the right cover 20a is positioned in front of the first and second protrusions 11 and 12 of the frame 10, the protuberance 40 is positioned at the end of the first protrusion 11, and the bracket 25 is disposed in a space formed by the 10 second protrusion 12. Further, the second flange portion 24 of the right cover 20a contacts the third protrusion 13 of the frame 10. When the screw 27 is inserted into the screw hole 26 of the right cover 20a and the screw hole 14 of the frame 10 under the above state, the right cover 20a is fixed to the right surface of the frame 10.

In the same manner, when the left cover 20b is inserted into the left surface of 15 the frame 10, the first flange portion 23 of the left cover 20b is positioned in front of the first protrusion 11 of the frame 10, the protuberance 40 is positioned at the end of the first protrusion 11, and the second flange portion 24 of the left cover 20b contacts the third protrusion 13 of the frame 10. When the screw 27 is inserted into the screw hole 26 of the left cover 20b and the screw hole 14 of the frame 10 under the above state, 20 the left cover 20b is fixed to the left surface of the frame 10.

Under the above state, the upper cover 30a is positioned on the upper surface of the frame 10 such that the protuberances 40 formed at the right and left covers 20a and 20b are inserted into the holes formed at the right and left ends of the upper cover 30a. Then, when the screw 27 are inserted into the screw holes 36 formed at the right 25 and left ends of the upper cover 30a, the screw holes 14 of the frame 10, and the screw hole formed through the bracket 25 formed at the right cover 20a, the upper cover 30a is simply fixed to the frame 10 and the right cover 20a.

As shown in FIG. 4, when the right cover 20a and the upper cover 30a are assembled with the frame 10, the right cover 20a and the upper cover 30a are respectively coplanar with the right surface and the upper surface of the frame 10.

When the lower cover 30b is assembled with the frame 10 in the same manner  
5 as the upper cover 30a, the lower cover 30b is simply fixed to the frame 10 and the right cover 20b. As shown in FIG. 7, under the above fixed state, the lower cover 30b is coplanar with the lower surface of the frame 10.

In this embodiment of the present invention, the protuberance 40 is formed on the right and left covers 20a and 20b, and the hole 50, into which the protuberance 40 is 10 inserted, is formed through the upper and lower covers 30a and 30b. However, the protuberance 40 may be formed on the upper and lower covers 30a and 30b, and the hole 50 may be formed through the right and left covers 20a and 20b.

As apparent from the above description, the present invention provides a refrigerator, in which upper, lower, left and right covers are assembled with a frame of a door under the condition that the upper and lower covers are disposed at precise 15 positions of the left and right covers by means of protuberances and holes, thereby allowing an assembly process to be simply achieved and shortening an assembly time. Further, since the door of the refrigerator is assembled by inserting the protuberances into the corresponding holes, the obtained structure of the door does not have any gap 20 between the upper and lower covers and the left and right covers, thereby increasing an assembly strength so that the upper and lower covers and the left and right covers are not detached from each other due to the repeated opening and closing of the door.

Although the preferred embodiment of the invention has been disclosed for 25 illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.